SWL Digest. Broadcast by Radio Canada International, this programme often includes information connected with special medium wave tests, compiled by Glenn Hauser. For a programme schedule write to RCI, P.O. Box 6000, Montreal Canada H3C 3A8.

See the current "World Radio TV Handbook" for full details of Media/DX programmes currently on the air. The Radio Netherlands "Booklist" gives all the details about this publication which is an invaluable aid to the medium wave DXer.

We trust this information is of use. Reaction from listeners as to its value would be appreciated.

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Radio Nederland Wereldomroep

LOOKING AT LOOPS

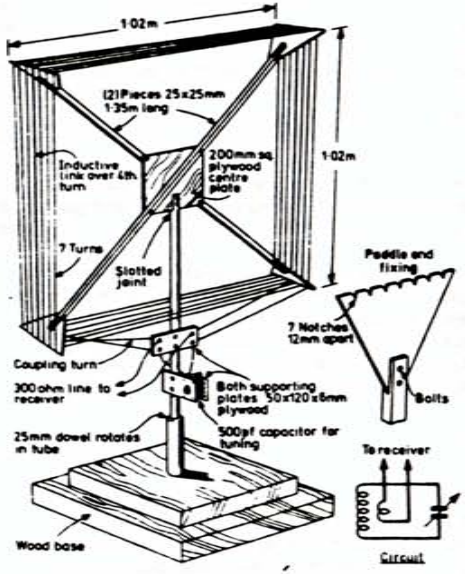
AN INTRODUCTORY GUIDE TO
MEDIUM WAVE LISTENING !

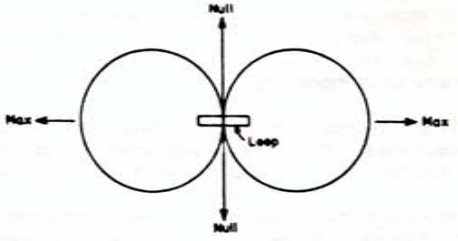
INTRODUCTION

The purpose of this information pamphlet is to assist those interested in the medium wave portion of the radio spectrum. This is known as Broadcast (AM) Band listening in North America. Over the years, many hundreds of articles have been published on this field of listening, and we do not claim any originality in the ideas set out below. As the title suggests, we hope to give you a start in this field of specialised listening, and then pass you on to references where you can find more detailed information. We do deal with this field of listening from time to time in "Media Network", though since we are a short-wave station, this subject does fall outside our main area of interest. Medium wave tips do appear in quite a few of the regional Media reports, broadcast each Thursdays in "Media Network". If you want more information than is printed here, we strongly recommend you contact one of the organisations mentioned at the end of the pamphlet.

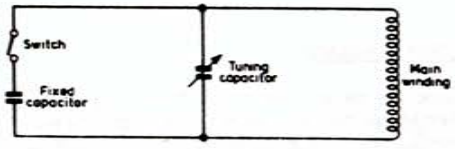
THE MEDIUM WAVE LOOP

For best results in this field of listening, i.e. between 500 and 1600 kHz, it is best to use a so-called "Loop" antenna, instead of a random length of wire strung out of the window. Various manufacturers offer "active antennas" which are variations on loop designs, but may cost quite a bit of money. Below is a design, originally put together by the late Ken Brownless, which has been up-dated and used with permission. Many hundreds of listeners have constructed such a loop antenna with success, at the cost of a few hours work, and readily obtainable materials.





The "figure-of-eight" polar response pattern of a loop aerial



Adding a switchable fixed capacitor allows a wider band to be covered in two ranges

The directional properties of this design make it possible to cut down on static interference and man-made noise in the vicinity. It should make a noticeable improvement to reception in the medium wave band. It's performance on short-wave though is less satisfactory, since this is part of the spectrum is not incorporated into the design calculations.

COMPONENTS NEEDED:

Wood - One piece 135 x 2.5 x 2.5 cm
Two pieces 66 x 2.5 x 2.5 cm. Frame cross pieces
One piece 76 x 2.5 cm dowel or broom handle.

3 ply- Four pieces 11 x 13 cm spacers
Two pieces 20 x 20 cm frame centre
Two pieces 5 x 13 cm to support capacitor and windings

Miscellaneous

- 40 metres insulated antenna wire (plastic cotton, or silk covered will do but NOT bare copper wire or the loop may short-circuit.) So called "bell wire" used to wire low-voltage electric door bells is usually ideal. Thick covered stranded copper wire is even better.

- 5 metres coaxial or flat twin feeder (to connect loop to set)

- Screws, adhesive, etc.

Capacitor - 500 picofarad (usually marked pF) variable tuning capacitor. Some shops may call it a "tuning condenser". These are available through electronic components suppliers in most parts of the world. The figure of 500 is not too critical, but using a 250 pF capacitor will mean you can't peak the loop on all frequencies in the MW band. In North America a value of 365 pF is common but a second fixed capacitor of 250 pF must be connected in parallel in order to tune below 600 kHz. This should be switchable, as shown in Figure 1A.

CONSTRUCTIONAL DETAILS

Having gathered all the components, read the following instructions all the way through, before you pick up any tools. To make the frame, take the four pieces of 3-ply (11 x 13 cm), cut them to a triangular shape to make the end pieces. Cut seven notches in each of these ends with a 1.2 cm spacing. Anchor these spacers into the centre of the ends of the main cross-pieces of the frame so it looks like a letter 'X'.

Place the length of dowel in position to support the frame. To hold the frame and dowel in position, fix the two pieces of 3-ply (20 cm square) in the centre of the frame, this should give a diagonal length of approximately 147 centimetres.

Secure the cross-pieces and dowel with either screws or strong glue. Now take the remaining two pieces of three-ply (5 x 13 cms). Drill four holes in one piece of wood to serve as anchors for the ends of the main and inductive turns. In the second piece of 3-ply, drill one hole to mount the tuning capacitor and two holes to hold the ends of the inductive link. Connect it to the feeder. Mount the second piece of wood at right angles to the first piece (see diagram). Drill a small hole in the dowel to allow the center turn of the main winding to pass through. This completes the frame.

LOOP WINDING

Wind the seven main turns first, beginning and ending at the lower piece of 3-ply on the dowel. Remember to allow sufficient length to make the connections to the tuning capacitor and also to thread the wire ends through the drilled holes when you begin and finish the windings.

Now wind an inductive turn over the top of the centre main turn (i.e. the fourth turn). It is important that there is no direct electrical connection between the 7 turn main loop, and the inductive loop which is connected to the receiver.

THE FINAL STAGES

Connection the ends of the seven main turns directly across the terminals of the tuning capacitor. The ends of the inductive turn should be soldered to the coaxial or flat twin feeder cable. If you are using a communications receiver, the connections are best made to the "dipole" terminals. If your set only have one terminal, marked "aerial" or "antenna", then one connection goes to this terminal and the other should be connected to the receiver chassis (often marked EARTH or GROUND). If your set has only one terminal, you may find that the loop works better when the inductive loop connections are reversed - try and see.

Switch on the receiver. You should find that by turning the knob on the tuning capacitor, a sharp peak in signal strength is noted at a certain point. You may find that peaks can only be found at one end of the medium wave dial. If you cannot peak the loop to tune up to say 1605 kHz, add a 250 pF fixed mica capacitor in PARALLEL across the terminals of the 500 pF tuning capacitor. You should include a switching arrangement to switch the mica capacitor in and out, or the lower end of the band may become unreachable. If you find that coverage down to around 480 kHz is impossible, this can be obtained by connecting a 250 fixed mica capacitor in SERIES. You may need this arrangement if you're specifically interested in navigation beacons. This capacitor should again be switchable. The loop itself is best placed near to the receiver, so avoid long feeder cable to the set!

MORE ADVENTUROUS?

The design above is a very basic medium wave loop, and will perform many times better than a piece of wire strung out in the garden. The whole purpose of the loop is that by swinging the construction round so that the frame is parallel to the transmitter site you're listening to, the signal strength of stations from all other directions on the same frequency (with the exception of exactly 180 degrees opposite) will be reduced.

The process of "nulling out" the offending interference requires patience and careful tuning. You may want to go further, and mount the wooden base on pedastal to allow adjustable tilting of the frame. The ability to move the loop in the vertical as well as the horizontal plane will improve the depth of some nulls very effectively...but it is not essential to start with.

Remember that the powers used by broadcast radio stations are quite high. Most receivers are sensitive enough, so the inductive winding will be sufficient to provide the optimum transfer of energy. Too much signal is just as disasterous as too little.

If your receiver has no connections for an antenna and earth, don't despair. A transistor portable can be used in association with a loop by placing the set inside near the centre of the frame. The set's internal ferrite rod winding and outside loop windings should be parallel to each other. The loop tuning capacitor used with the rotating loop will give improved results. Only the seven main turns of the loop are used in this case. No direct connection is made from the loop to the transistor receiver, i.e. it a purely inductive coupling is used.

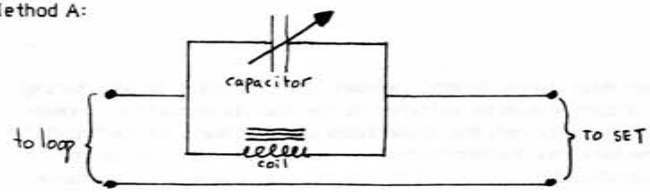
ADDITIONAL CIRCUITS

Medium Wave Trap

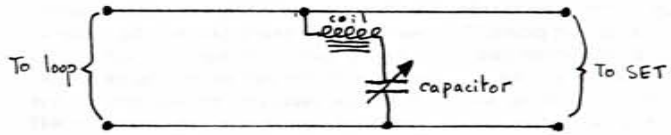
We've included a diagram for a tuned circuit with the simple function of removing one strong local station from the medium-wave band. If you live near a very powerful medium-wave transmitter, you may find it appears not only in its proper place on the dial, but also at various points all over the dial, ruining weak signals. If you build a trap, and place it between the antenna and receiver, it will severely attenuate the strength of the local station, which may stop it overloading the front-end of the receiver.

The trap simply consists of a tuned circuit, adjusted to coincide with the frequency of strong station. If you have more than one powerful station, then more than one trap will be needed. This device has a fairly sharp response, which means that it has its greatest effect when the DX signal is more than 150 kHz away from the strong, interfering signal.

Method A:



Method B:



Two methods to connect trap to your set. Try both.

The circuit simply consists of a medium wave coil, and a variable capacitor of about 300 pF. You'll find a suitable coil inside any old medium-wave radio. The black ferrite core is essential too. Better still, order a "ferrite core MW antenna suitable from a domestic portable." Most constructor outlets will know exactly what is needed, and may even have ready made traps available.

USING THE LOOP

The directional property of the medium wave loop is usually the reason for building it. Once connected to the receiver, find two signals that sound mixed together, i.e., operating on the same frequency. This shouldn't be hard to do, considering the crowded state of the band. If the two co-channel stations are in different countries, it may be possible to remove one of the interfering signals by slowly rotating the loop. The ideal case is when two stations are operating on the same frequency, one, e.g., south of the receiving location, the other to the east. You'll find there is a point where one station fades out completely leaving the other, and vice-versa. If the stations are in fact closer together geographically, the ability to "null" out the interference may not be so great, but enough to identify the station.

IDENTIFYING INTERFERENCE

One of the problems of medium wave DXing is the large number of sources that can cause interference to long-distance listening. There is nothing worse than finding a wierd buzz or whistle obliterating the frequency you want to listen to, or sometimes the entire band. If you live in a built up area, these problems tend to be more acute, so here are a few cause and effect problems you might encounter.

Noted effect. A buzzing noise which appears to pop up all over the MW band. If measured these noise peaks are about 15 kHz apart.

Cause: Television interference! As well as picking up signals, TVs also radiate noise, due to a built-in oscillator (in effect a very low power transmitter). This radiation will come from the back of the set, and also from the TV antenna. Keep the MW loop well away from TV antennas and receivers. To verify this as the cause, check the band in the late evening or early morning, when most televisions have been switched off.

Noted effect A signal, carrying no music or speech appears at regular spots on the dial, about 60 kHz apart.

Cause: May be due to your tape recorder, in recording position. There is a bias oscillator needed to make a recorder function, and your receiver is picking this up. Move the tape-recorder to another spot.

Noted effect: Whistles, which change in pitch as the set is tuned, and remain in the background.

Cause :Generally caused by poor receiver alignment. NEVER fiddle with the coils inside the receiver, unless you have the proper test equipment. Consider having the receiver adjusted by a service engineer.

Noted effect A local station appears on its usual frequency, and also about 900 kHz further away.

Cause: The receiver has insufficient selectivity, and this is a problem noted on many receivers in the budget price class. Little can be done, though an antenna tuner may assist.

Noted effect: A rough distorted splatter is heard in different parts of the band, mixing with weak signals. It beats in time with the speech or music from a local station.

Cause: This effect is known as cross-modulation. The signal from a local station is overloading the sensitive circuits of your receiver. Shorten the antenna, or build a trap, and tune it to the frequency of the local station.

Noted effect: A strong signal seems to "spread" over more of the band than weak signals.

Cause: This is due to insufficient selectivitu of the receiver. You can shorten the antenna to reduce the effect, (but this reduces the strength of the DX signals too), or consider having your receiver fitted with a smaller bandwidth filter. Sets costing more than about US $800 are sometimes modified by dealers to reduce this effect.

LOOP REFERENCES

Amsterdam listener Ben Peters, interviewed in a recent Radio Netherlands programme, has spent many hours researching the subject of medium wave loop antennas in The Netherlands. The loop is certainly not a new invention, and much of the in-depth research some years back had a military application for direction-finding.

Here is a list of references that you might want to check out at a local science library.

1907 Electrical Engineering (England), Volume 2, page 771-775,

1908 Electrical Engineering (England), Volume 3, page 348-351/507, E.Bellini and A. Tosi. "A directive system of wireless telegraphy". A description, + diagrams, of probably the first circuits, formed by 2 'open' or 'closed' loops, at a right angle to each other. Also included is and description of a 'radiogoniometer' (invention claimed by A.Artom; see his biography in IRE Transactions Aeronautical + Navigational Electronics,, 1957, Volume ANE-4, No.2, page 45-47). This is capable of directive reception and direction finding right through 360 degrees, used fixed antennas. You can also check British Patents 22879 and 145049, by E. Bellini, for a goniometer with particular 'differential' capacitors instead of coils (2/4 fixed,, 1 rotates).

1913 British Patent 4514, 2 pages, C.S. Franklin (Marconi Company). The author describes a big loop with the good directional properties of a very small loop, by using capacitors all around the loop, with a value so as to compensate for the inductance of the length of wire between those capacitors. It is interesting because it uses half a wavelength between vertical conductors, which normally means its directivity is nowhere as sharp as a small loop.

Loop References (cont)

1914 British Patent 24098, 5 pages, C.S. Franklin (Marconi Company). The author describes two compact circuits, each formed by 3 Loops, capable of 'uni-directional' receiving, without using an 'open' antenna. Plenty of diagrams.

1915 British Patent 5783, 5 pages, C.S. Franklin (Marconi Company). Description, + diagram, of a 'not so compact' circuit, formed by four loops (two pairs of 'crossed' loops), capable of nulling a very nearby transmitter, capable of receiving 'uni-directional' without using an 'open' antenna and capable to receive 'at the same time' two equal wavelength stations, located opposite each other, by using two receivers connected to this circuit.

1919 Proceedings of the Institute of Radio Engineers (USA), Proc.IRE-, Volume 7, page 207-256/543-553, R.A. Weagant: "Reception thru static and interference". This describes, with diagrams, experiments and very good results obtained with 'not compact at all' and compact circuits, formed by 2, 3 Loops and 1 Loop and an 'open' antenna. Same subject British Patents by Weagant (the first together with Waterman), all 1919- 129625 132548 138586 138588. In Wireless Age (USA) 1920, Volume no.3, page 18, is described and diagrammed Weagants 'underground' version with 2 Loops, co-planar, opposing 'galvanically' connected.

1919 British Patent 130107, 5 pages, H. Richmond (Marconi). This describes, with diagrams, compact circuits, formed by 2 fixed or 'fixed rotatable' loops at a right angle to each other and a moveable small link coil, capable of nulling a station lying in a different direction as the desired station, without lessening the strength of the latter.

1920 British Patent 136524, 8 pages, H.J.J.M. de Regnauld de Bellescize. This describes, with diagrams, compact circuits, formed by 2 or 3 Loops, capable of nulling a nearby powerfull transmitter, making it possible to receive stations further away.

1920 Proceedings of the Institute of Radio Engineers (USA), Volume 8, page 358-415, G.W. Pickard : "Static elimination by directional reception". One of the earliest research paper on loops gives some interesting Loop history and describes. Plenty of diagrams and circuits, formed by Loop(s) and 'open' antenna(s), using part of the loop itself as 'open' antenna in some circuits, capable of a 'cardioid' pattern.

1920 British Patent 149532, 5 pages, J. Hollingworth. This describes, with diagrams, circuits, formed by 3 or more Loops, capable of a reception pattern ranging form 'about' to 'almost perfect' omni-directional, depending on the number of loops.

1920 British Patent 143580, 3 pages, E.R. Clarke. This describes how to reduce the inductance of a very large loop, thus allowing for a much greater area to be occupied by the loop. Factual information is given of a big 'one turn' loop, the turn is formed of several wires (connected 'in parallel' at certain points) in 'cage' form, 5 feet in diameter.

1921 The Radio Review (England), Volume 2, page 60-65/231-248, T.L.Eckersley: "The effect of the Heaviside Layer on the apparent direction of Electromagnetic Waves". This describes, with diagrams, a 'not so compact' circuit, formed by 2 Loops (one vertical and rotatable, one a very big horizontal) for research on deviations of the 'up/down' coming wave(s). Fascinating reading on what early researchers thought was happening in the ionopshere.

1921 British Patent 146997, 10 pages, J.L. Hogan. This describes, with diagrams, compact or non-compact, circuits, formed by two 'open' antennas, formed by two loops or formed by a loop and 'open' antenna. The article stresses the importance, for satisfactory phasing, for the two antennas to have equal receiving power for the signal 'to be nulled' and to have unequal receiving power for the signal 'to be received'.

1921 The Radio Review (England), Volume 2, page 394-403, G.M.Wright and S.B. Smith. "The Heart-Shaped Polar Diagram and Its Behaviour under Night Variations". This describes, together with diagrams, a compact circuit, formed by 2 loops at a right angle to each other and an 'open' antenna, capable of a cardioid reception pattern, and the varying effects 'night-time' can have on this pattern, although without affecting the proper 'null' position.

Loop References (cont)

1921 British Patent 158927, 5 pages, C.S. Franklin (Marconi Company). This describes, together with diagrams, a 'not so compact' circuit (but can be made smaller) with even greater directional properties, at the expense of gain, formed by several loops (or combinations of loops), allowing for (both in the horizontal and vertical plane) a very sharp 'uni-directional receiving power'.

1922 Scientific Papers of the Bureau of Standards (USA), Volume 17, no. 431, page 589-606, G. Breit: "The field radiated from 2 Horizontal Coils" This paper describes, together with diagrams, 'not so compact' circuits, formed by 2 (or 4) loops, capable of producing pronounced directive beams about 45 degrees from the horizontal.

1922 Scientific Papers of the Bureau of Standards (USA), Volume 17, no. 428, page 529-566, F.A. Kolster and F.W. Dunmore: "The Radio Direction Finder and its application to Navigation". This refernce describe, with diagrams, what a loop is, how it works, how it should be constructed, how certain undesirable effects on the loop's performance can be eliminated, how a loop as a 'direction finder' works (with the additional problems then encountered) and how a 'uni-directional' (and cardioid) reception pattern is obtained and made use of. Good reading.

1924 Journal of the Institution of Electrical Engineers (England), Volume 62, page 249-264, R.H. Barfield: "Some experiments on the Screening of Radio Receiving Apparatus". This describes, with diagrams, several 'reasonable' compact screening arrangements, formed by a 'cage' of wires (formed into 'galvanically' open or closed loops) in/near which a loop or loops are situated. Both electric and magnetic screening is dealt with.

1925 Wireless World (England), July 15th, page 84-87, N.W. McLachlan: "Interference" /part 2/ This discusses directional reception and selective circuits. It gives a very interesting diagram of the reception pattern of 4 'cascaded' loops, i.e. a very elongated figure of 8.

1925 Proceedings of the Institute of Radio Engineers (USA), Volume 13, page 477-506, J.H. Morecroft and A. Turner: "The Shielding of Electric and Magnetic Fields". This describes, with diagrams, shielding using coils (not loops 'per se') and metal plates.

1925 Experimental Wireless and the Wireless Engineer (England), Volume 2, page 828-837, E. Green: "The Polar Curves of Reception for Spaced Aerial Systems". This describes, with diagrams, several 'not compact at all' circuits, formed by 'open' antennas, and formed by various combinations of loops (and combinations of loops), due to C.S. Franklin, capable of sharp and/or undirectional receiving patterns.

1925 Proceedings of the Institute of Radio Engineers (USA), Volume 13, page 685-707, H.T. Friis: "A New Directional Receiving System". The paper describes, with diagrams, experiments and results with compact and non compact circuits, formed by 1 loop and 'open' antenna. Here is an example of an interesting 'condenser' type, i.e. two wire nettings of 15 x 15 feet and with 6" between them in a horizontal plane. The first combination locates the direction of atmospheric interference and the second defeats it.-

1928 A.Bailey, S.W. Dean and W.T. Wingtringham, Proceedings of the Institute of Radio Engineers, page 1645 and further: This article describes how the "directivity of dissimilar antennas may be increased, with no loss in desired signal receptivity, by combining them in arrays with little or no seperation between the individual antennas; the directivity of similar antennas, combined as above, may be increased but with great loss of gain, or else should the individual similar antennas be seperated a distance comparable to and of the same magnitude as the wavelength employed". That covers a lot of possibilities (!).

1928 British Patent 280224, 4 pages, L. Bouthillon. This describes, with diagrams, compact or not so compact circuits, formed by a number of Loops, either co-planar (same plane) configured, where adjacent loops are connected in series with opposite phase, or co-axial (parallel plane) configured, where adjacent loops are connected in series in the same phase. Both configurations can give very sharp directivity depending on the number of loops used.

Loop References (cont)

1928 Wireless World (England), August, page 186-188/247-251, R.L.Smith-Rose: "Radio Direction Finder for the Experimenter". This describes, with diagrams, the 'antenna' effect of a Loop, how screening defeats this effect and gives thorough construction details for a sharp null screened Loop (the screen being formed of a 'tube' of parallel connected wires enclosing the 'tank'); See also in the same magazine, 1926, August, page 193-197 on this subject.

1928 British Patent 278743, 3 pages, Radio Holland. This describes, with diagrams, a compact circuit, formed by 1 small rotatable direction finding Loop and 2 big, fixed, coplanar, loops, of which one has a variable area and in the center of the other is located the small rotatable loop. Interference of a 're-radiator' (e.g.ship's mast) can now be nullified and are correct bearings ascertained.

1930 United States Patent 1747262, 5 pages, J.H. Pressley. This describes, with diagrams, several compact ciruits, formed by a Loop (with large winding depth) and dipole, a Loop (with large winding depth) and a small loop at right angles to it; and a Loop with a particular form of 'split' winding. All are capable of defeating the 'displacement current' effect of a great winding depth, which blurs nulls.

1930 Wireless World (England), August/September, page 190-192/232-234, R.L. Smith-Rose;" Effective Screening. This describes, with diagrams, how a loop(s) used as a screen(s) can screen off a room or part of a room.

1930 British Patent 306487, 6 pages, F.A. Kolster, G.G. Kruesi. This decribes, with diagrams, a compact circuit, formed by a Loop with three instead of two vertical sides, capable of 'uni-directional' receiving patterns and a cardioid receiving pattern. Fascinating design.

1931 United States Patent 1821650, 4 pages, F.A. Kolster. This describes, with diagrams, a compact circuit, formed by 2 Loops at a right angle with each other, which achieves a more pronounced (an elongated figure of 8) directional effect compaired with the normal 'figure of 8' (of a normal loop).

1937 United States Patent 2082812, 4 pages, R.H. Worrall. The paper describes, with diagrams, a compact circuit, formed by 2 horizontal and 1 vertical Loop, rotatable as a whole and capable of nulling/direction finding regardless of the state of the polarization (as experienced during night-time reception).

1938 Gesammelte Vortrage der Hauptversammlung 1937 der Lilienthal-Gesellschaft fur Luftfahrtforschung, Verlag von E.S.Mittler + Sohn, Berlin, Germany; page 307-337, T.L.Eckersley :"Fundamental problems in Radio Direction-Finding with Reference to Aircraft Navigation." Note: Curiously in Englsih and an excellent piece of fundamental Loop literature, but might be hard to find. If your efforts have failed, especially with this one, see the address shdwn at the end of these references. The article escribes what goes on when direction finding is attempted with shortwave. It goes into detail with a rather large circuit (physically), formed by 2 co-axial loops, capable of the utmost correct (polarization error free) bearings possible.

1939 British Patent 532164, 11 pages, K.H. Meier. This describes, with diagrams, a compact circuit, formed by 2 Loops at a right angle to each other, capable of 'omni' directional reception, normal directive reception (figure of 8) and 'uni' directional reception (cardioid). All this is without the help of an 'open'antenna.

1940 Journal of the Institution of Electrical Engineers (England), Volume 86, page 396-398, R.H. Barfield: "The performance and limitations of the Compensated Loop Direction Finder". This discusses, with diagrams, circuits formed by 1 Loop and 1 dipole or 1 Loop and 2 dipoles, suggested by different investigators to achieve freedom of polarization error. A comparison is made with other types of direction finders.-

1940 United States Patent 2190717, 4 pages, R. Kummich, H. Rukop. This describes, with diagrams, not so compact circuits, formed by 2, 3 and more Loops, rotatable in a fixed relation and fixed, capable and not capable of nulling/direction finding under conditions of Night-time listening.

Loop References (cont)

1943 Proceedings of the Institute of Radio Engineers (USA), Volume 31, page 56-66/384, G.F. Levy: "Loop Antennas for Aircraft". Describes, with diagrams, low and high-impedance Loops, discusses factors limiting good loop performance and the, very remarkable, beneficial effect of loop screening. See also: Journal of the Franklin Institute (USA), 1919, Volume 188, page 289 and further, A.S. Blatterman: "Theory and Practical Attainments in the Design and Use of Radio Direction Finding Apparatus using Closed Coil Antenna", for material used by Levy (and much more !).

1945 Proceedings of the Institute of Radio Engineers (USA), Volume 33, page 307--318, F.E. Terman and J.M. Pettit: "The Compensated-Loop Direction Finder". The paper describes, with diagrams, various polarization effects on a Loop direction finder and a circuit, formed by a Loop and Dipole. According to the authors, this combination deserves more attention then it has been given by previous investigators, being capable of nulling/direction finding under conditions of Night-Effect almost all the time.

1947 Journal of the Institution of Electrical Engineers (England), Volume 94, part 3, page 99-107/133, W. Ross: "The Development and Study of a Practical Spaced-Loop Radio Direction Finder for High Frequencies". Discusses, together with diagrams, relative compact circuits, formed by 2 co-axial Loops, capable of polarization error-free direction finding; information/diagrams as to how horizontal loops should be configurated for this purpose. Several interesting references.

1961 Proceedings of the Institute of Radio Engineers (USA), Volume 49, page 1222-1223; "Correspondence"/O.K. Nilssen: A Non-directional Ferrite Rod Antenna Arrangement Suitable for AM Radios. This describes, with diagrams, compact circuits, formed by 2 ferrite Loops at a right angle to each other, in which a 'non critical' 90 phase-shift is introduced by simple means, making the set capable of 'omnidirectional' reception.

1966 Proceedings of the Institution of Electrical Engineers (England), Volume 113, No.1, page 49-61, P.J.D. Gething: "High-Frequency Direction Finding" This gives an EXCELLENT and maybe unique 'overview' of direction finders of the past and in use. Several photographs are included of apparatus and the quite extensive bibliography has 199 references. This article is certainly worth looking up.

1982 Radio Communication (Radio Society of Great Britain, Potters Bar , England), November, page 944-949, J.A. Lambert: "A Directional Active Loop Receiving Antenna System". An illustrated description, with constructional details, of 'not so compact' circuits, formed by several co-planar or co-axial Loops, with a reception pattern steerable in the horizontal and vertical plane.

The above journals should be available with the help of any library, especially of a University with an Electrical or Electronic Engineering Department. The complete patent specifications, should be available from your national Patent Office (e.g. in UK, contact British Patent Office, Department of Trade and Industry, State House, 66-71 High Holborn, London WC1R 4TP, England Tel (01-831-2525)). There is also a European Patent Office based in the suburb of The Hague. This has an extensive reading library, but is not geared to mass photo-copying and distribution by post. They will however consider small individual requests, which should be addressed to European Patent Office, Patentlaan, Rijswijk, The Netherlands. If you do not have complete details of a particular patent, there is another commercial bureau that may be able to offer assistance. They can be reached at Exter Patent, Willemwitsenplein 34, 2596 BK Den Haag, The Netherlands (Tel: 31 70 245447). Please note that Radio Netherlands cannot offer free copies of these extensive articles for copyright reasons. Any further loop information you think might be of interest is welcomed by the compiler of this section. Ben Peters, Lynbaansgracht 318, 1017 WZ Amsterdam, The Netherlands.

MAGAZINE ARTICLES ON MEDIUM WAVE LOOPS

Here is a bibliography of recent articles on medium wave loops. Many of the magazines can be found in public libraries. For the current addresses of the publications see Radio Netherlands' companion publication called the "BOOKLIST". This is free on request. Each entry below begins with the surname of the author concerned.

MOLLOY CHARLES; MW/LW Loop Aerials; Practical Wireless Nov 1979.

MAYHEW DAVE; The Sooper Loop; Practical Wireless, July 1986

MAYNARD G S; Q Multiplier and Spiral Loop Antenna; Practical Wirelss March 1981.

LAMBERT J A ; A directional active loop receiving antenna system: Radio Society of Great Britain journal "Radio Communication" Nov 1982.

MAYNARD G S ; The W-Q MW Loop; Practical Wireless Nov 1985.

SUTCLIFFE H; Effective Length of Ferrite Rod Aerials; Wireless World Dec 1978.

BAKER PHILIP G; Aperiodic Loop Aerial; Wireless World May 1980.

WHITT S; MW Loop Differential Amplifier; Practical Wireless Feb 1983.

SANDYS ERIC; Loop Antenna Amplifier; Technical Topics, "Radio Communication", March 1986.

WHITT S; MW Differential Matching Amplifier for Loop Aerials, Medium Wave Circle Reprint No 10 June 1986.

MAYNARD G S , "C" Wound Loop and Differential Current Amplifier; Medium Wave News Nov 1982.

BARRATT John ; Automated Direction Finder; Wireless World Jan 1982.

SCHEMEL R E ; The Loop Aerial Revived; Wireless World July 1979.

MARRIS RICHARD: Long Wave Loop Antenna; Radio & Electronics World, April 1986.

WHITT S; "Modified Loop" Medium Wave DXing; Radio & Electronics World July 1986.

BOOKS TO CONSIDER

"Radio Beacon Handbook". Written by Dr J Trochimczyk, this German publication is one of the best and most accurate guides to this form of specialised medium wave listening. Over 2000 non-directional beacons, with call-sign, power and location. Published by Wilhelm Herbst Verlag, P.O. Box 450506, D-5000 Cologne 41, Federal Republic of Germany. Price (in 1987) DM 30 -.

"North American Radio TV Station Guide"; Vane Jones; Published by Howard Sams, Indianapolis. ISBN number 0-672-22296-5. This is the 15 edition published in 1984. It cost US$9.95. May now be updated.

"Whites Radio Log": Published by WorldwidePublications Inc. P.O. Box 5206, North Branch NJ 08876 USA. 136 page three way list of all MW, FM, and TV stations in Canada and USA. #4.00 including postage via Medium Wave Circle.

FURTHER INFORMATION

Many short-wave clubs also have a column in the magazine devoted to AM broadcast, or Medium Wave DXing. This can provide the happy medium between both SW and MW listening. On the other hand, if your interests extend to serious medium wave listening, we suggest you contact one of the organisations below for further information. This does not claim to be a complete list, but these groups have been in existence for many years, and many of their members have done a lot of development research in the field. Club bulletins will keep you informed as to new equipment, catches, and the experiences of other listeners, and are essential for the enthusiast. If any Radio Netherland's listener has further information on clubs of this type that he or she feels should be included in this data sheet, we are always open to suggestions. Our aim is to provide consumer information for the benefit of our listeners.

Medium-Wave only Organisations:

Medium Wave Circle 103 Foxhall Road, Ipswich IP3 8JZ, England. This group offers a regular bulletin (8 times a years) which should interest most European listeners. Some 20 + reprints are offered from previous magazines, at nominal reprint costs. These include lists of recently heard stations, a look at beacons on the medium wave band, plus phone dialling codes for the USA / Canada and the Caribbean. The last item may help in identification during phone-in programmes. Remember to send return postage (2 International Reply Coupons overseas or stamped self-addressed envelope within Britain) for reply from this non-profit organisation. The club welcomes both experienced and novice medium-wave listeners.

PLAY DX, Via Davanzati 8, I-21580 Milano, Italy. Although not a specialist MW DX club, this group of very active listeners issues a bulletin with excellent quality tips every two weeks. Many MW tips are included. Send return postage for further information.

The National Radio Club, Publications Center, Box 164, Mannsville, New York 13661 USA. Write to this address (with return postage) for details of a wide variety of magazine re-prints about medium wave. Very extensive. The club also publishes an excellent regular bulletin devoted exclusively to Medium Wave listening. Send for membership details and sample copy requests to NRC, Membership Center, P.O. Box 118, Poquonock, CT 06064, USA. Enclose US $2.00. for a sample. Also produces certain publications available to non-members:

International Radio Club of America P.O. Box 21074, Seattle, WA 98101, USA. Publishes a bulletin "DX Monitor" 34 times a year (weekly from October - March). Sample copy of "DX Monitor" is 50 cents or 3 IRCs. Orders for IRCA publications from overseas are also subject to a postage surcharge, so one should write first. Excellent and extensive reprint service too, details for return postage. Author Ben Peters (see earlier notes) has written a number of constructional articles for the ICRA, amongst them a design for a 3 Loop/Adcock system. This is an extensive system with extremely high selectivity, though obviously more complicated than the simple loop.

Note that the above groups are all non-profit making, run by enthusiasts. It is, therefore, essential to include return postage with any requests you might have. Listeners in the UK with access to British Telecom's Prestel system can try the WAVEGUIDE page on 25887. Likewise, for details of short-term medium wave licenses check the pages of the Department of Industry on page 2040.

DX Information on the air:

Media Network The Thursday communications magazine from Radio Netherlands, carries medium wave tips from time to time, usually in the regional reports. See our programme and frequency schedule.

World DX News Carried by Adventist World Radio Europe, Sundays at 0915 UTC October-March winter time, 0815 UTC March-October when European summer time is in force. The frequency is currently 9670 kHz (as of March 1987). The Danish SW Clubs International provide a Medium-Wave only selection of loggings on the last Sunday in each month, compiled by Gordon Bennett. Broadcasts on other Sundays also feature the occasional MW tip, so it is worth listening in. For complete current schedule write, AWR, Box 2590, Lisbon, Portugal.